Transmission-Based Precautions

MDRO Management in Long Term Care Facilities Workshop

Louisiana Office of Public Health
Infectious Disease Epidemiology Section

2017

Objectives

By the end of the presentation, attendees will be able to:

- Define contact, droplet and isolation precautions
- Define disinfection
- Define sterilization

This presentation will include a mix of presentation slides and case studies.

Transmission of Infectious Agents in Healthcare Settings

Transmission of infectious agents within a healthcare setting requires three elements: a source of infectious agents, a susceptible host with a portal of entry receptive to the agent, and a mode of transmission for the agent.

Transmission: Direct Contact

- Gastrointestinal, respiratory, skin, and wound infections
- Most agents transmitted by droplets can also be transmitted by contact
- Transmission through the skin is the third most common mode of transmission of infection. Penetration through intact skin is unlikely
- Fecal-Oral
  - Excreted by the feces
  - Transmitted to the oral portal of entry through contaminated food, contaminated water, milk, drinks, hands, and flies
  - Site of entry: oropharynx for some microorganisms; intestinal tract for most viruses

Transmission: Droplet

Examples of organisms transmitted through Droplet Transmission:

- *Hemophilus influenzae*
- Meningococci
- Pneumococcal infections (invasive, resistant)
- Bacterial respiratory infections (Diptheria, Pertussis, pneumonic plague, pneumonia)
- Viral respiratory infections
  - Adenovirus
  - Influenza
  - Mumps
  - Parvovirus
- Any paroxysmal cough

Transmission: Airborne

- Droplet nuclei are droplets of less than 5μ in diameter
- Transmission may occur over a long distance

Transmitted by Droplet Nuclei

- **Tuberculosis (Infectious)**
- **Suspects of TB: request sputum smear**
- **Measles**
- **Varicella**
- **Smallpox (hemorrhagic)**

Sources of Infectious Material

- Blood
- Internal body fluids
- Genital fluids
- Transplacental
- Secretions
- Excretions
- Mucosal membranes
- Skin, squames
- Tissue
- Bites

Blood, internal fluids and genital fluids do contain blood borne pathogens (HIV, HBV, HCV, CMV)

Standard Precautions

- Applied to all patients in a healthcare setting
- Treat all patients' blood or body fluids as if they are infectious material
- Originated from the Bloodborne Pathogen Standard by OSHA in 1991
- Group of infection prevention practices that include hand hygiene and use of gloves, gowns, masks, eye protection, or face shields depending on anticipated exposure
- Formerly termed "Universal Precautions"

Contact Precautions

- Used for diseases transmitted by contact with the patient or the patient's environment
- Diseases that cause heavy environmental contamination require gowns and gloves on room entry
  - Vancomycin-resistant *Enterococci* (VRE)
  - Methicillin-resistant *Staphylococcus aureus* (MRSA)
  - *Clostridium difficile*
  - Respiratory Syncytial Virus (RSV)

Contact Precautions: Patient Placement

- Single room is preferred
- Patients with the same disease/organism may share a room
- When there is a shortage of rooms, prioritize patient cohorts by condition that may foster transmission, giving them priority for single patient room
  - Uncontained drainage
  - Stool incontinence
- In long term care, contact precautions are only needed with symptomatic, not colonized, patients

Contact Precautions: Personal Protective Equipment (PPE)

- Wear gown and gloves on room entry
- Change the gown and gloves between patients even if both patients share a room and/or one or both are on Contact Precautions
- Use hand hygiene between glove changes

Contact Precautions: Patient Transport

- Limit patient transport outside the room to medically necessary purposes
- Inform the receiving department of the Transmission-based Precaution status of the patient
- Cover or contain potentially infectious body fluids before transport
- Transporter should discard contaminated PPE before transport
- Don clean PPE to hand the patient at the destination

Contact Precautions: Long-Term Care Settings

- Patient placement should be handled on a case-by-case basis
- Each facility should make decisions on the basis of infection risks to other patients in the facility

Example: A patient in a nursing home has had three episodes of loose and watery stools in a 24 hour period. The facility is setup to where residents share rooms and a bathroom with roommate. The patient's roommate is asymptomatic, but it is noted that one of their neighbors has recently developed diarrhea too. What should be done?

Answer: Cohort the symptomatic patients into their own room; clean and disinfect surfaces especially high touch areas; submit stool specimens for testing; cohort staff that are treating these patients so that the infection is not spread further.

Contact Precautions: Environmental Measures

- Clean daily with a focus on high touch areas, e.g. patient bathrooms and areas close to the patient
- EVS workers should don gown and gloves before room entry to clean and disinfect the patient's room
- Use products with a CDIFF inactivation label combined with adherence to hand hygiene and good laundry practices
- Use of 1:10 bleach solution is recommended
- Bleach may be used as an adjunct to cleaning or as a final wipe down of frequently touched surfaces
- Processes for room disinfection should be audited, especially in outbreak scenarios, to ensure compliance

Discontinuation of Contact Precautions

- Discontinued when signs/symptoms of the infection have resolved or according to pathogen-specific recommendations

DISCONTINUING ISOLATION

- CDC currently recommends contact precautions for the duration of illness when care for patients with CDI.
  - **Some experts recommend continuing contact precautions for at least 48 hours after diarrhea resolves**
- At this time data do NOT exist to support extending isolation as a measure to decrease CDI incidence.

Droplet Precautions

- Prevent transmission of diseases caused by large respiratory droplets that are generated by coughing, sneezing, or talking
- Examples of diseases transmitted by droplet route:
  - Influenza
  - Pertussis
  - Bacterial meningitis due to *Neisseria meningitidis*

Droplet Precautions: Patient Placement

- Single rooms preferred; however, patients with the same disease may share a room
- Priority should be given to patients with excessive sputum production when single-patient rooms are in short supply
- Spatially separate patients by at least 6 feet
- Draw privacy curtains between patients
- Avoid placing immunocompromised patients with patients who are on Droplet Precautions especially if those patients may have adverse outcomes from infection

Droplet Precautions: PPE and Patient Transport

- Wear a surgical mask on room entry
- Handle items contaminated with respiratory secretions with gloves
- Change PPE between patients and perform hand hygiene
- Limit patient transport outside the room to medically necessary purposes
- If the patient must leave the room, instruct them to wear a surgical mask and follow respiratory hygiene and cough etiquette. Patient transporter does not need to wear a surgical mask.
- Notify the receiving department of the isolation precautions status.

Droplet Precautions: Long-Term Care

- Make decisions on patient placement on a case-by-case basis after considering all options
- All patients should be instructed in the proper use of respiratory hygiene and cough etiquette

Droplet Precautions: Environmental Measures and Discontinuation

- Daily cleaning with hospital-approved disinfectant of high-touch and horizontal surfaces
- Environmental services personnel should don a surgical mask before room entry
- Discontinue Droplet Precautions after signs and symptoms have resolved or according to pathogen-specific guidelines

Airborne Precautions

- Used to prevent transmission of infectious organisms that remain suspended in the air and travel great distances due to their small size
- Transmission concern is from airflow patterns within the facility
- Examples
  - Measles
  - Smallpox
  - Chickenpox
  - Pulmonary tuberculosis
  - Avian influenza

Airborne Precautions: Environmental Measures

- Routine cleaning of high touch surfaces is standard
- Environmental services should wear an N95 respirator on room entry
- Room should remain unoccupied for enough time to allow for complete air exchange to occur (applicable to acute and ambulatory settings)

Airborne Precautions: Personnel Restrictions and Discontinuation

- Restrict susceptible HCP from entering rooms of patients known or suspected to have chickenpox or disseminated zoster (varicella zoster virus) if other HCP are available
- Immunocompromised and pregnant HCP should also be restricted from these patients
- Discontinue Airborne Precautions according to pathogen specific recommendations in the guideline

Other Types of Transmission

- Transmission through skin/mucous membrane
- Blood and tissue exposure:
  - skin penetration, mucosal membranes
  - Invasive procedures
- Gastrointestinal transmission
  - Food/animal host
  - Contaminated food product
  - Water/natural bacteria or fecal contamination
- Sexual transmission (mucous membrane transmission)
- Perinatal transmission
- Transplacental transmission
- Arthropod-borne transmission

Prevention of Multidrug-Resistant Organisms

- MDROs are resistant to one or more classes of antimicrobial agents
- Often resistant to multiple classes of antimicrobial agents and can remain on environmental surfaces for months
- Control methods for MDROs are based on seven fundamental elements that include the following:
  1. Administrative measures/adherence monitoring
  2. MDRO education
  3. Judicious use of antimicrobials
  4. Surveillance
  5. Isolation Precautions
  6. Environmental measures
  7. Decolonization

MDRO: Administrative Measures/Adherence Monitoring

- Provide appropriate number of hand-washing sinks and alcohol gel dispensers
- Maintaining nursing staff levels, having dedicated staff for patients with MDROs
- Enforcing strict adherence to hand hygiene and Contact Precautions practices, including cohorting patients with similar MDROs
- Funding for adequate supplies

MDRO: Education

- Unit-specific education should help facilitate understanding of MDROs in the facility
- Education should include rates, trends and prevention strategies
- Create a culture that supports and promotes desired behaviors, such and hand hygiene and Transmission-based Precautions and reduction in device usage
- Active communication between facilities when a patient transfers prevents increased transmission between patients with facilities

MDRO: Judicious Use of Antimicrobials

- Evidence-based principles for judicious use of antimicrobials and tools for implementation are key to controlling MDROs
  - Formulary restriction
  - Education
  - Automatic stop orders
  - Antimicrobial cycling
  - Prior approval programs

MDRO: Surveillance

- Calculate MDRO incidence (new cases) on the basis of clinical culture results
- Calculate MDRO infection rates
- Use molecular typing for investigating outbreaks (IDEpi can help!)

MDRO: Isolation Precautions

- Contact Precautions should be used while the patient is symptomatic in a long term care facility
- Contact Precautions may reasonably be discontinued after antimicrobial therapy has ended or the infection has resolved

"3 negative tests" is not an appropriate protocol for *Clostridium difficile*!

MDRO: Environmental Measures and Decolonization

- There can be a high inoculum of healthcare-associated pathogens in a cold room with high relative humidity
  - Fungi
  - Bacteria
  - Viruses
- Cleaning and monitoring of adherence to environmental cleaning practices can determine success in controlling MDROs
- Regimens involving MRSA have sometimes been successful; however, decolonization regimens are not generally effective enough to recommend routine use and are not standardized

Inter-facility Transfer Communication Tool

The Inter-facility Infection Control patient transfer form can assist in fostering communication during transitions of care. This tool was developed by the Utah Healthcare-associated Infection (HAI) working group and shared with Centers for Disease Control and Prevention (CDC) and state partners. This tool can be modified and adapted by facilities and other quality improvement groups engaged in patient safety activities.

Inter-facility Infection Control Transfer Form: Domains

- Demographics
- Patient's current infection, colonization, or history of positive MDRO status
- Patient's current symptoms and devices
- Patient's current antibiotic use
- Vaccination history
- Submitter information, date, and contact information

http://www.cdc.gov/hai/pdfs/toolkits/InfectionControlTransferFormExample1.pdf

Education of Employees

- Training related to the cycle of infection and the prevention of infection
- Explanation of resistant organisms and methods to prevent transmission, including isolation precautions/techniques
- Training in Standard and Transmission-based Precautions
- Facility policies for sanitation and appropriate linen and trash handling
- Special emphasis on care of resident's environment
- Education about the importance of appropriate hand washing and hand hygiene

Appropriate Disinfection Sterilization for Common MDROs

Organism	Method
Clostridium difficile (Contact Precautions)	The use of a 10% sodium hypochlorite solution (bleach) mixed fresh daily (one part household chlorine bleach mixed with nine parts tap water) has been associated with a reduction in CDI in some settings.
Tuberculosis (Airborne Precautions)	Primary environmental controls consist of controlling the source of infection by using local exhaust ventilation (e.g., hoods, tents, or booths) and diluting and removing contaminated air by using general ventilation. Secondary environmental controls consist of controlling the airflow to prevent contamination of air in areas adjacent to the source airborne infection isolation (AII) rooms; and cleaning the air by using high efficiency particulate air (HEPA) filtration, or ultraviolet germicidal irradiation.
Non-Avian Influenza (Droplet Precautions)	Standard cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying disinfectants to frequently touched surfaces or objects for indicated contact times) are adequate for influenza virus environmental control in all settings within the healthcare facility, including those patient-care areas in which aerosol-generating procedures are performed.

WOULD YOU RATHER…?

Objective: In teams, choose a person on the following slide and determine which precautions are necessary based on their scenario.

Standard Precautions | Contact Precautions | Droplet Precautions | Airborne Precautions

Would You Rather?


Mildred


Arnold


Laura


Harold


Jenny


Doug

Would You Rather?


Mildred

Mildred is a retired educator. After some health challenges, her family moved her into an assisted living facility. She generally enjoys group activities and visiting with her neighbors. Her bridge partner recently developed diarrheal illness, and a day later she became ill with loose and watery stools. What should be done?

Home

Would You Rather?


Arnold

Arnold is a retired Navy veteran. He began to feel ill with fever, chills, and altered mental status at his nursing facility. He was transferred to the nearest acute care hospital where he was diagnosed with Carbapenem-producing *Klebsiella pneumoniae*. He was treated with antibiotics and subsequently ordered for discharge; however, his original facility is refusing to re-admit him because he has had CRE. What should be done?

Home

Would You Rather?


Laura

Laura is a patient with a known history of *Clostridium difficile*. She was placed on antibiotics subsequent to a urinary tract infection. After being on the medication, she developed loose and watery stools and was placed on isolation precautions and treated for her diarrhea. The stool came back positive for CDIFF toxin A. The director of nursing is recommending that Laura be placed on Contact Precautions indefinitely and separated from other residents. What should be done?

Home

Would You Rather?

Harold

Harold is a patient who was recently hospitalized after contracting Influenza during a Flu outbreak at his nursing facility. What should be done regarding environmental cleaning at the nursing home?

Home

Would You Rather?

Jenny

Jenny became infected with Norovirus and was isolated from her fellow patients in her long term acute care hospital. The facility is worried about the potential of spreading the virus to patients who are uninfected.

What should be done?

Home

Would You Rather?

Doug

Doug is suspected to have cellulitis. His calf has become warm to the touch, red/angry, and is beginning to form a head. He was transferred to an acute care hospital where he was diagnosed with MRSA. What should be done?

Home

Resources

- Berends C and Walesa B. Chapter 29 – Isolation precautions (transmission-based precautions). Association of Infection Control and Epidemiology Text. 2015.
- Bodily-Bartrum M, Franck J, Spaulding L, and Zeller J. Chapter 61 – Long-term care. Association of Infection Control and Epidemiology Text. 2015.
- Centers for Disease Control and Prevention. Infection Control in Health-Care Settings. Accessed 23 Jan 2017. Available at https://www.cdc.gov/tb/publications/factsheets/prevention/ichcs.htm.
- Centers for Disease Control and Prevention. Inter-facility infection control transfer form for states establishing HAI prevention collaboratives. Accessed 23 Jan 2017. Available at http://www.cdc.gov/hai/pdfs/toolkits/InfectionControlTransferFormExample1.pdf.

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